

SmartMesh IP VManager API Guide

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1 About This Guide

1.1 Related Documents

The following documents are available for the SmartMesh IP network:

1.1.1 Getting Started with a Starter Kit

- [SmartMesh VManager Easy Start Guide](#) - walks you through basic VManager installation and a few tests to make sure your network is working.
- [SmartMesh IP Embedded Manager Easy Start Guide](#) - walks you through basic embedded manager installation and a few tests to make sure your network is working.
- [SmartMesh IP Embedded Manager Tools Guide](#) - the installation section contains instructions for installing the serial drivers and example programs used in the Easy Start Guide and other tutorials.

1.1.2 User's Guide (This Guide)

- [SmartMesh IP User's Guide](#) - describes network concepts, and discusses how to drive mote and manager APIs to perform specific tasks, e.g. to send data or collect statistics. This document provides context for the API guides. It also contains a glossary of SmartMesh terms.

1.1.3 Interfaces for Interaction with a Device

There are two interfaces for interaction with a Manager - an Application Programming Interface (API) for programmatic interaction, and a Command Line Interface (CLI) for human interaction.

- [SmartMesh IP Embedded Manager CLI Guide](#) - used for human interaction with an embedded manager (e.g. during development of a client, or for troubleshooting). This document covers connecting to the CLI and its command set.
- [SmartMesh IP Embedded Manager API Guide](#) - used for programmatic interaction with an embedded manager. This document covers connecting to the API and its command set.
- [SmartMesh IP VManager CLI Guide](#) - used for human interaction with a VManager (e.g. during development of a client, or for troubleshooting). This document covers connecting to the CLI and its command set.
- [SmartMesh IP VManager API Guide](#) - used for programmatic interaction with a VManager. This document covers connecting to the API and its command set.
- [SmartMesh IP Mote CLI Guide](#) - used for human interaction with a mote (e.g. during development of a sensor application, or for troubleshooting). This document covers connecting to the CLI and its command set.

- [SmartMesh IP Mote API Guide](#) - used for programmatic interaction with a mote. This document covers connecting to the API and its command set.

1.1.4 Access Point Notes

- [SmartMesh IP User's Guide](#) - describes reprogramming DC2274 for use as an Access Point Mote.
- [VManager AP Bridge User's Guide](#) - user's guide for the Access Point Bridge reference software

1.1.5 Software Development Tools

- [Dustcloud.org](#) - contains documentation and links to various open source software tools for exercising mote and manager APIs and visualizing the network.

1.1.6 Application Notes

- [SmartMesh IP Application Notes](#) - Cover a wide range of topics specific to SmartMesh IP networks and topics that apply to SmartMesh networks in general.

1.1.7 Documents Useful When Starting a New Design

- The Datasheet for the mote being used, e.g. the [LTC5800-IPM SoC](#), or one of the [modules](#) based on it.
- The Datasheet for the embedded manager being used, e.g. the [LTC5800-IPR SoC](#), or one of the [embedded managers](#) based on it.
- A [Hardware Integration Guide](#) for the mote/manager SoC or [module](#) - this discusses best practices for integrating the SoC or module into your design.
- A [Hardware Integration Guide](#) for the embedded manager - this discusses best practices for integrating the embedded manager into your design.
- A [Board Specific Integration Guide](#) - For SoC motes and Managers. Discusses how to set default IO configuration and crystal calibration information via a "fuse table".
- [Hardware Integration Application Notes](#) - contains an SoC design checklist, antenna selection guide, etc.
- The [ESP Programmer Guide](#) - a guide to the DC9010 Programmer Board and ESP software used to load firmware on a device.

1.1.8 Software

- ESP software - used to program firmware images onto a mote or module. Described in the [ESP Programmer Guide](#).
- Fuse Table software - used to construct the fuse table as discussed in the [Board Specific Configuration Guide](#).

1.1.9 Other Useful Documents

- A list of [Frequently Asked Questions](#).


1.2 Conventions Used


The following conventions are used in this document:

`Computer type` indicates information that you enter, such as specifying a URL.


Bold type indicates buttons, fields, menu commands, and device states and modes.

Italic type is used to introduce a new term, and to refer to APIs and their parameters.

 Tips provide useful information about the product.

 Informational text provides additional information for background and context

 Notes provide more detailed information about concepts.

 **Warning!** Warnings advise you about actions that may cause loss of data, physical harm to the hardware or your person.

`code blocks display examples of code`

1.3 Revision History

Revision	Date	Description
1	12/16/2015	Initial revision
2	8/16/2016	Condensed introduction to VManager API

2 Introduction

This guide describes commands used to communicate with the VManager through the Application Programming Interface (API). The API is intended for machine-to-machine communications (e.g. a host program talking to the VManager). In contrast, the Command Line Interface (CLI) is intended for human interaction with a manager, e.g. during development or interactive troubleshooting.

Messages to the manager are sent using an HTTP-based protocol. For an overview of the manager capabilities referenced in this document, please see the [SmartMesh IP User's Guide](#).

To use the API, a client sends an authenticated HTTP request that contains one of the supported commands, one command per request. A client may also send an HTTP request to receive notifications from the VManager. The response to this request is a never-ending stream of notifications.

The API describes:

- Resources are HTTP endpoints that can be used to query information, update configuration and initiate commands to the network.
- Notifications are asynchronous messages from the VManager or network to the client.

The API is based on HTTP interactions. An RPC-style interface for configuration and control operates over HTTP using the GET, PUT, POST and DELETE commands. Client authorization is performed as a part of the HTTP session. The HTTP interface is wrapped into mandatory TLS for secure connections over the network. The VManager API provides the endpoint of the HTTP session. The VManager API uses JSON as the representation format for the body of requests and responses. A notification interface is also provided via HTTP with the server sending a chunked HTTP response stream of messages over a long-lived connection. The client establishes a notification session (using the same authentication protocol) with a GET request that describes the set of notifications the client wants to receive.

2.1 Security

The VManager API is only accessible via HTTPS, which protects the confidentiality of the data exchanged. This release of the VManager API supports user authentication using password-based authentication. Password-based authentication implements the [HTTP Basic authentication](#) mechanism that involves sending a the user name and password to authorize an HTTP request. It is easy to implement and is supported by numerous HTTP libraries.

To access the API, a user must be authenticated as one of the active users. Every user has an associated privilege level that defines what operations are accessible to it. There are two roles, user and viewer, for which a user can be authorized.

	GET	PUT	POST	DELETE
Viewer	yes	no	no	no

User	yes	yes	yes	yes
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3 API Definition


The VManager public API documentation is available in several formats online from the VManager VM:

Format	URL on VM
Interactive HTML (Swagger UI)	https://VM_HOST:8888/docs/ui/index.html
Static PDF	https://VM_HOST:8888/docs/Voyager.pdf
Static HTML	https://VM_HOST:8888/docs/html/index.html

To reach the documentation provided on the VManager, the `VM_HOST` in the URLs above should be replaced with the hostname or IP address of your VManager VM.

The Interactive HTML documentation shows the input and output of VManager API commands interactively. The *Try it out* button in the description of each resource will send a request to the VManager API using the credentials entered at the top of the page.

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